



Munition Stockpile for
Sustainability

*By Mr Tan Chow Tat, Head Convention Munitions
Singapore Armed Forces*



Challenges of Traditional Munition Stockpiling

1



High Stockpiling Cost

- For Sovereignty (National Security)
- Long Procurement Lead-Time [2-3 years]

2



High Wastage

- Unable to utilise all via training
- High replacement cost
- High disposal cost

3



Environmental Concerns

- Pollutants during Training
- Disposal Method as an “Afterthought”
- High Carbon Footprint

4



If adopt Emergency Buy Model:

High Risk

- National security risk for lower stockpile level
- Emergency Buy is opportunistic



- Need to find a more sustainable way to stockpile [From both Environmental & Fiscal aspects]

Our Solution: Munition Sustainability Framework

Objective: Rethinking to make Munition Stockpile more Sustainable

Life-Cycle Management

Acquisition

In-Service

Disposal

Problem Opportunity Statement (POS)

#1

To minimise Impact to Environment

#2

To minimise Cost of Stockpiling

Strategies

1

Design for Environment

2

Reduce Inventory

3

Reduce Disposal

Methods

Greener Munitions
(e.g. Lead-Free & Biodegradable)

“Better” Munitions

Shelf-life
Predictive Programme

Design Using
Circular Economy Principle (*DuCE*)

Design for Multiple-Usage
(*DfMU*)

Design for Component Change-out (*DfCC*)

Design for Demilitarisation
(*DfD*)

Design for Standardisation
(*DfS*)

Design for Repurpose
(*DfR*)

Key Enablers

1

Towards Zero & “Green” Mindset
(Management)

2

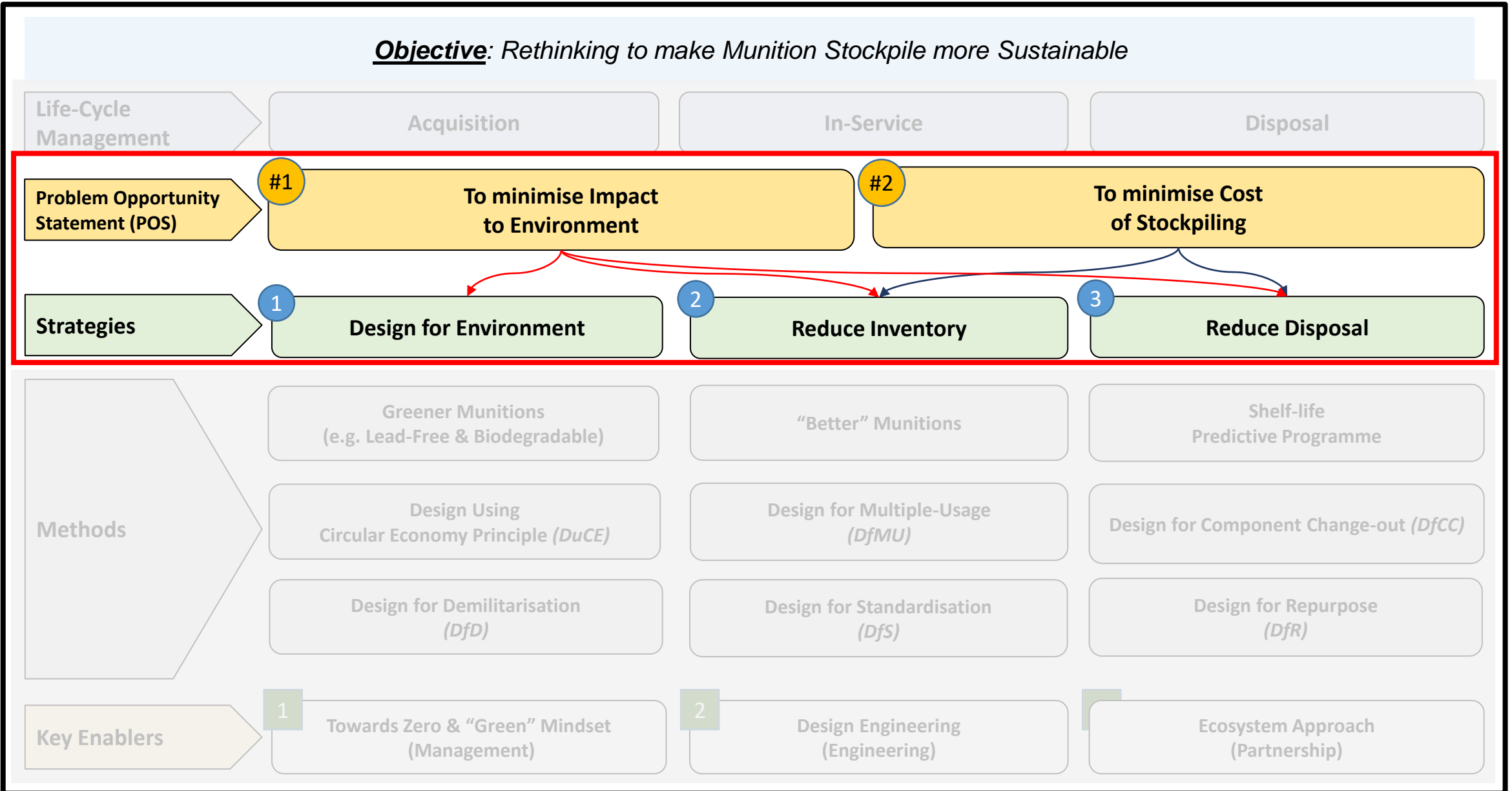
Design Engineering
(Engineering)

3

Ecosystem Approach
(Partnership)

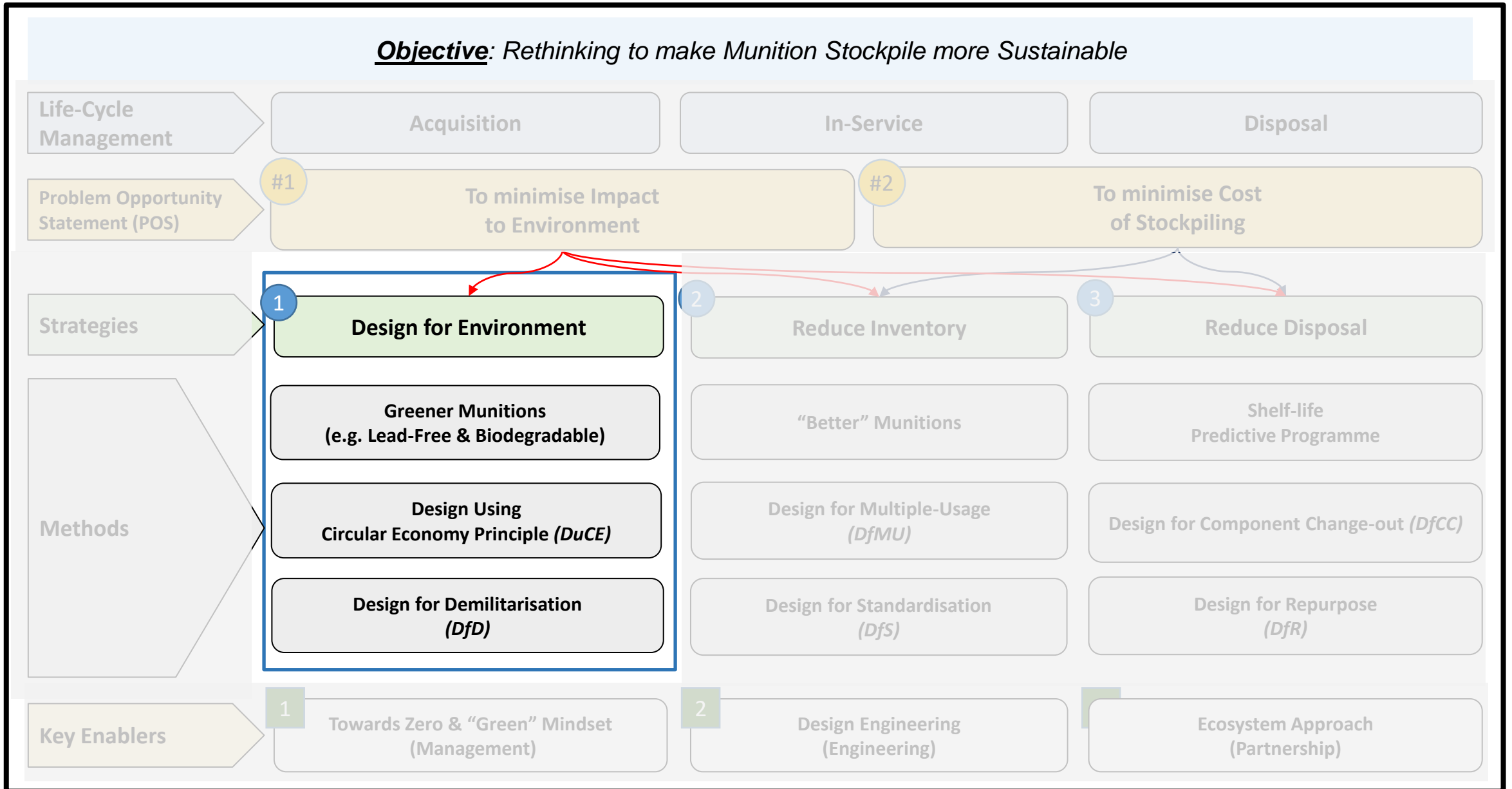
POS & Strategies of Our Framework

Objective: Rethinking to make Munition Stockpile more Sustainable



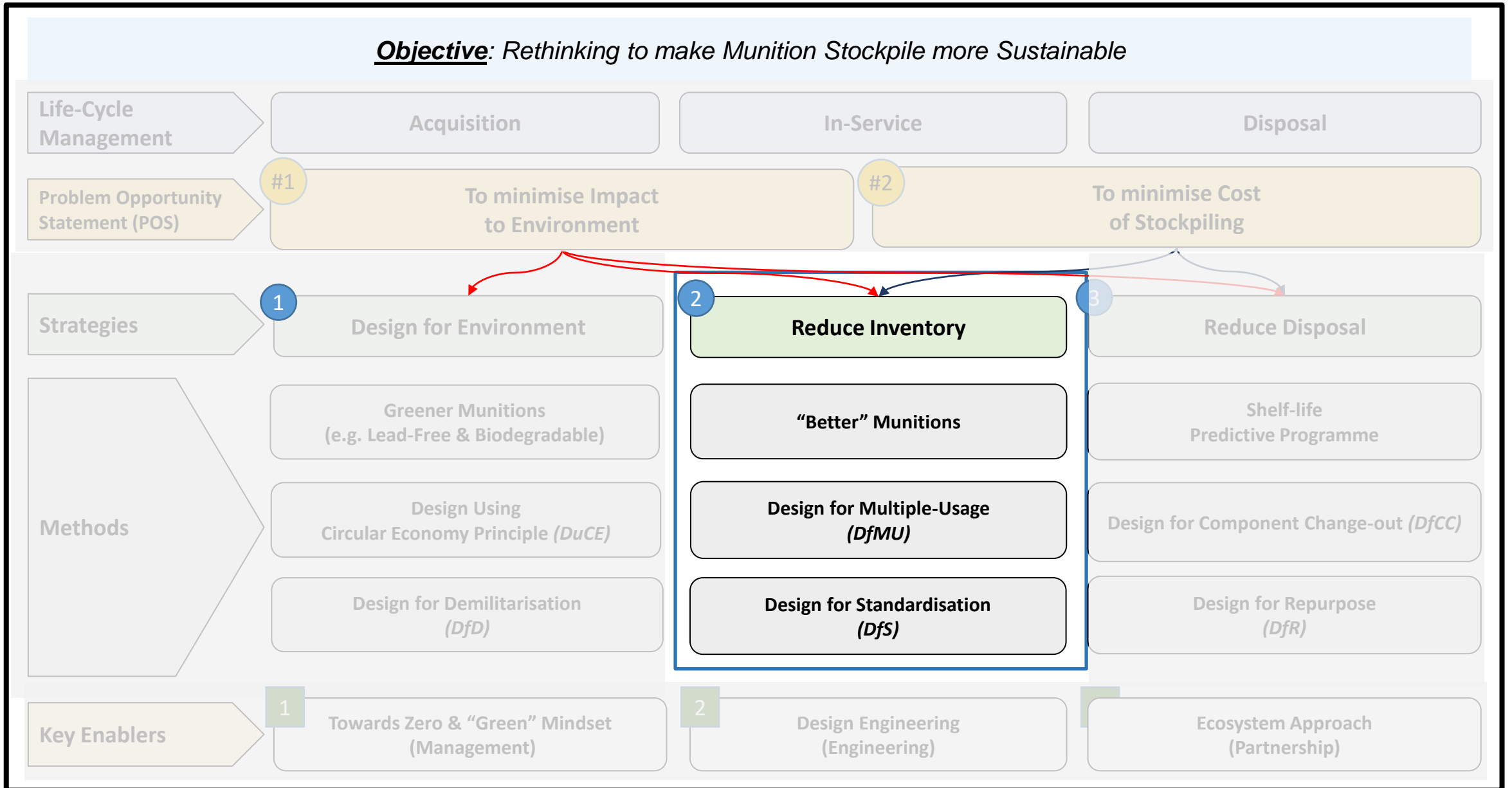
Proposed Methods

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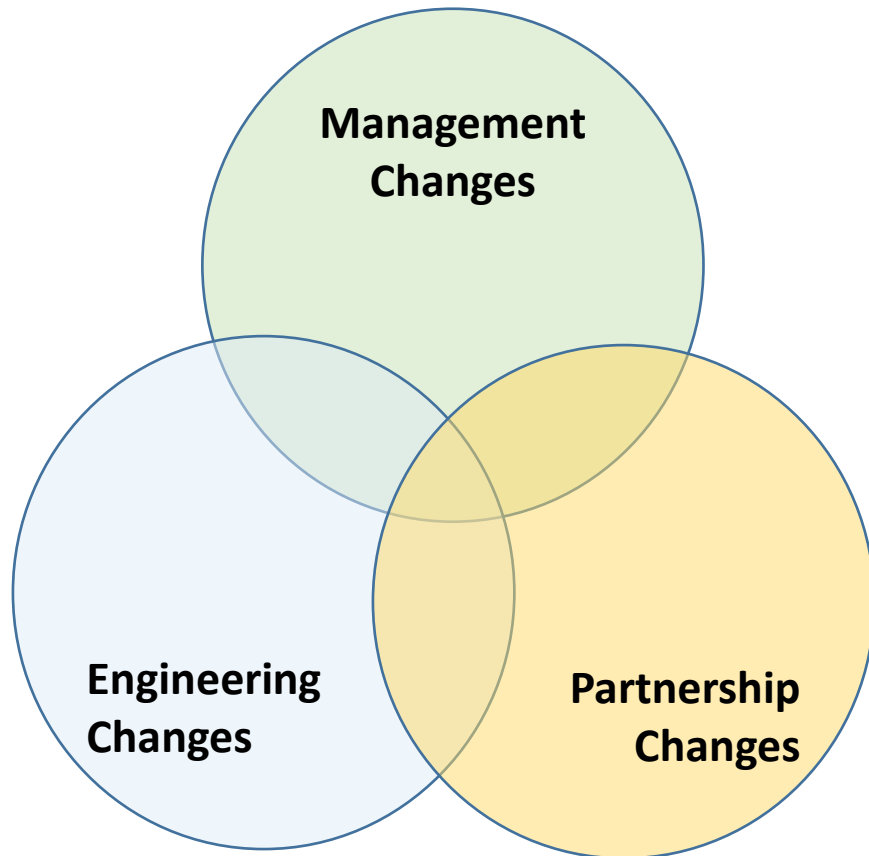
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Key Enablers

The Trinity Changes



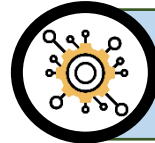
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Towards Zero Waste & Green Mindset

- Embrace Circular Economy
- Make it as cardinal requirement
- Care for next generation

2



Design Engineering

- Employ Design Thinking
- Include inputs from Multidisciplinary Domains
- Utilise AI/DA to cut waste

3



Ecosystem Approach

- Crowdsourcing of Best Ideas
- Inclusion of academia, research institutions & commercial entities